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The Control of Liver Rot of Sheep.*

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During the past two years, much research concerning the control of liver rot of sheep has been in progress. These recent investigations have so considerably advanced our knowledge that it is opportune to discuss briefly the results obtained and their application. Effective control measures can now be recommended and the writer puts in a plea for a systematic attempt to abolish the disease as an epidemic.

Important Features of Liver Rot bearing upon the Problem of Control. Sheep pick up the encysted stage of the liver fluke in grazing. In the intestine, the young flukes emerge from these cysts, make their way to the liver and enter the bile ducts of that organ. There they mature and continue a parasitic existence, laying many thousands of eggs which, passing down the ducts, reach the outer world in the droppings of the sheep. Some time after reaching water, these eggs hatch and the free-swimming form seeks a certain freshwater snail, *Limnaea truncatula* (also, possibly, *L. pereger*), which it enters. Within the snail, development and multiplication take place until a final stage, in which the organism bores its way out, is reached. Swimming actively, this form seeks a blade of grass, or portion of another plant, on which it forms an adherent cyst. These cysts, which are about the size of a small pin's head, may form free on the surface of water. The ingestion of this encysted stage by sheep (or other suitable host) completes the life cycle. The freshwater snails mentioned are common inhabitants of wet places, the sides of ditches, pools, etc., particularly on clay soils.

The season of the year during which sheep may become infested is generally believed to be the late summer and autumn months, but it extends into the winter in wet open seasons. The period which elapses between the picking up of the encysted stage and the development of the fluke to egg-laying maturity does not appear to have been carefully investigated hitherto. As a result of certain preliminary observations, the writer believes that this phase of development occupies a period of about ten weeks. We may assume, then, for the purposes of control, that flukes picked up during the late summer will mature to the egg-laying stage early in October, and that those picked up later will have matured by April 1st. Future work may necessitate a modification of this view, which is simply accepted as a working hypothesis.

It should be noted that cattle and rabbits may be infested with flukes and become, therefore, distributors of eggs. Considerable numbers of cattle harbour flukes without showing marked evidence of disease. During liver rot epidemics, many rabbits die in affected areas as a result of infestation, but the writer believes that, in the great majority of cases, their death occurs before the flukes have reached the egg-laying stage. It is very probable that cattle and rabbits play a much smaller part in the distribution of eggs than do sheep.

General Principles applicable to the Control of Liver Rot. (1) It is obvious that sheep and cattle should be kept away from land on which they may become infested. Very often this is impossible, and the fluke must be attacked at vulnerable points in the cycle of its life history.

(2) Since the freshwater snails, mentioned above, must be available before the liver fluke can multiply and spread, steps may be taken to destroy them.

(3) Attempts may be made to destroy the fluke within the sheep and other hosts, thus preventing the distribution of eggs and the propagation of the parasite.

It will be appreciated that any or all of these principles should be applied wherever possible. The third necessitates the use of anthelmintic drugs and success will depend on the efficiency of the system of dosage adopted. It must be realised also that such dosage must be comprehensive and not limited to any group or species in a community of infested animals. Investigations have been concerned, chiefly, with the practical application of the second and third principles mentioned above.

Application of the General Principles Enunciated Above.

(1) Avoidance of Infestation. Since the earliest days, it has been recognised that low-lying damp land, especially on clay soils, is "dangerous" as regards fluke infestation. Undoubtedly the loss caused by liver rot has been minimised by keeping sheep from such land. This precaution, which greatly reduces the value of so many grazings and renders others valueless for sheep, cannot, however, be widely observed. It may be possible, by means of fencing, to cut off small dangerous portions of fields which are otherwise sound. Fencing-out has been adopted with a certain degree of success, but, obviously, this is a method which can only be applied on a limited type of grazing.

(2) Destruction of the Snails. (*a*) *The Value of Certain Birds.* Certain birds, ducks and lapwings in particular, make freshwater snails part of their diet. Where practicable, flocks of ducks may be given free range over damp pasture and the lapwing should certainly be protected.

(*b*) *The Value of Drainage.* Efficient drainage has been recognised as, perhaps, the best method of reducing the number of snails on any pasture, and it will be generally agreed that drainage is the greatest need of large areas of land in these islands. Certainly the prosecution of many drainage schemes is costly and each field presents its

*In this paper, liver rot of sheep is limited in its application to cover only disease due to infestation with *Fasciola hepaticum*. Infestation by *Dicrocoelium dendriticum* appears to occur only rarely within the British Isles, and the writer has had no opportunity of studying its control.

own particular difficulties of levels and outflow, but quite apart from the opening up of new drains, proper attention to existing waterways can considerably increase the value of many pastures and, incidentally, reduce the number of snails on the adjoining land. On many occasions the flooding of an area of land in the vicinity of a partially blocked ditch or drain, or a ditch the sides of which have been broken down, has been responsible for the infestation of many sheep. If ditches are cut with straight or steep edges, and thereafter kept clear and the edges attended to, a reduction of the number of snails within that area may readily be effected.

(c) *The Use of Copper Sulphate.* In the search for a substance which would destroy the snail, without spoiling the pasture or rendering it dangerous to stock, lime, salt and other materials were given a trial. None of these proved of value, but the discovery that very dilute solutions of copper sulphate are particularly inimical to freshwater snails opened up new possibilities. At the suggestion of Daubney, Walton made his first tests with copper sulphate, under field conditions, in 1921, continued his work in 1923 and in conjunction with Jones, further extended it during 1925.

These researches have convincingly shown that the proper application of copper sulphate is a cheap and practical method of wiping out the snail population of the area covered. The sulphate has been employed in three different manners. Solutions may be sprayed over the area by means of a machine: either one of the large horse-drawn implements used to spray potato crops or to destroy charlock, or by one of the "knap-sack" type employed by horticulturists. The strength of solution selected depends on the nature of the area to be sprayed. On fairly dry land, ½ per cent. solution should be liberally applied that the whole area may be thoroughly wetted. On partially flooded land solutions of 1 per cent. or 2 per cent. should be used to allow for the further dilution which must occur before contact with the snail is effected. A smaller quantity per acre would suffice in this case. The amount of solution must also vary with the degree of protection afforded by herbage, being greater where the grass is long. Walton found amounts varying from 80 to 137 gallons per acre sufficient. Sprays may be used under a variety of conditions, but the rather general absence in affected districts of suitable apparatus limits their use.

As a dust, one part of finely-ground copper sulphate to four parts of china clay, an efficient dressing may be applied to small areas—the sides of ditches, etc.

The broadcast sowing of finely-ground copper sulphate mixed with dry sand appears to be an admirable mode of application. Walton and Jones found mixtures of four and of eight parts of sand to one of the sulphate efficient when sown at the rate of 1¼ and 2¼ cwt. per acre respectively. These broadcast mixtures appear to be applicable to all types of "danger" spots and areas.

Copper sulphate dressings may be applied at any season but, very probably, their use during the month of June will be attended with greatest advantage. After an application, a careful watch should be maintained to determine whether snails have re-entered the area by migration or by carriage in water. Norris has shown that sheep may be allowed to graze sprayed pasture after seven days. Following a dust or broadcast application, it appears advisable to keep stock from the treated land until rain has fallen.

Despite the fact that more than four years have elapsed since the value of copper sulphate was demonstrated, it cannot be said that this method is widely used to control the ravages of liver rot. It would appear that one reason for its partial failure to meet the case is that, at the season of the year when the use of copper sulphate is attended with most advantage, the stimulus of being face to face with the disease is absent. Few farmers can be made to consider and apply active control measures during the summer months. As the season during which they frequently experience loss approaches, their thoughts may more easily be directed to the control of the disease.

(3) Destruction of the Liver Fluke within the Sheep and other Mammal Hosts. (a) *The Use of Carbon Tetrachloride in Sheep.* Investigations directed towards the finding of a drug which might be used in the destruction of the liver fluke infesting sheep, received relatively little attention, so far as these Islands are concerned, until the severe outbreak of 1920-21. Then a proprietary preparation of male fern named "Danistol" was introduced from abroad. Sold in carefully regulated doses ready for administration it gained favour as an efficient remedy.

Liquid extract of male fern B.P. had been little used within the British Isles until its value was investigated during 1924-25 by the writer and by Norris. These researches showed that the drug could be employed provided reasonable care was exercised. During its extensive use that season, it was evident that certain factors affecting its toxicity were not properly understood and required investigation. Further work indicated that one factor was the age of the extract. Freshly prepared material is much more dangerous than old.

Experiments conducted at this centre during 1925-26 showed that *pure* carbon tetrachloride was highly efficient and very safe. The efficiency of dosage with 1 c.c. was established, and sheep, in the advanced stages of liver rot, tolerated perfectly doses as large as 50 c.c. While this investigation was in progress, Norris, in Ireland, was working along similar lines. He did not have opportunity to pursue his research very far, but obtained evidence of the efficiency and safety of the drug.

It must be noted that the efficiency of these drugs is limited, for it has been shown that they only destroy those flukes which are approaching maturity to the egg-laying stage, and those actually mature. Certain less mature forms escape. Thus, sheep which are infested with flukes in various stages of development cease to pass eggs following dosage but, at the earliest, four weeks after treatment, eggs re-appear in their droppings.

We must compare the apparent value of these three preparations: "Danistol," extract of male fern, and carbon tetrachloride—particularly from the points of view of efficiency, safety and economy, and select the most suitable. All have demonstrated high value in destroying mature, and almost mature, flukes, and each has failed in a degree at least approximately equal, to destroy less mature forms. "Danistol" is acknowledged to be "safe." Extract of male fern has a safety factor too small to

permit that degree of error which is liable to creep in when large numbers are treated. The range of safety when carbon tetrachloride is employed is so wide that this drug may be used with confidence. The cost of "Danistol" places it at a serious disadvantage and discourages considerably its use to "treat," let alone to "control," liver rot of sheep. The cost of extract of male fern is much smaller, but considerably greater than that of carbon tetrachloride, which involved the expenditure of but one or two pence per head each treatment. It may be added that the employment of carbon tetrachloride necessitates dosage on one morning only, whereas each of the other drugs must be administered on two consecutive days.

It is evident that carbon tetrachloride is by far the most valuable drug. Eminently suitable for the dosage of large numbers of sheep at intervals, it provides a means to kill all the flukes infesting even large flocks before they reach maturity to the egg-laying stage, thus preventing the distribution of eggs and the spread of liver rot.

The administration recommended is a single dose of 1 c.c. of *pure* carbon tetrachloride in soft gelatine capsule. It is the writer's practice to prepare the sheep for dosage by removing them from pasture in the late afternoon of the previous day. This preliminary period of starvation may, however, be omitted, as it does not appear to affect the efficiency of the administration. In either case the sheep may be sent to pasture immediately after the capsule has been given. This mode of treatment has been found efficient for sheep up to 140lb. weight, and it is probable that its range of efficiency is much greater. Since this dosage destroys only those flukes which are mature or approaching maturity, it is necessary to re-dose after a period. Then those flukes which previously escaped, and have in the interval reached a stage of development at which they may be assailed by the drug, will be destroyed. The evidence at present available indicates that this interval should be one of about four weeks. Dosage of a flock at monthly intervals during the season when flukes may mature would, therefore, prevent the deposit of eggs on the pasture.

The extent to which this drug is employed in future years to prevent the outbreak of epidemics of liver rot must depend upon the realisation by farmers in those districts which are menaced by the disease of the feasibility of materially reducing by one simple measure their current loss from the disease and at the same time lessening its future incidence.

It must be realised that each administration to an affected sheep of an efficient drug is, in itself, a general control measure apart altogether from the treatment aspect. Such administration decreases the number of eggs which are distributed, decreases the opportunity for snail infestation, and therefore the chance of stock becoming infested with flukes. In addition to those members of a flock which show evidence of infestation, it must be remembered that many others, if not all, are likely to be harbouring flukes and distributing eggs. *These considerations make it obvious that mass treatment (dosage of whole flocks, not of individual sheep) should be adopted and that such treatment is a means of control. The tendency to dose only the obviously affected sheep of a flock should be combated by pointing out the great advantages of mass treatment. The low cost of carbon tetrachloride makes this mass mode of treatment very sound economically.*

The actual system of dosage adopted must depend upon several conditions relating to the incidence of the disease and the opportunities for the collection of sheep on each individual farm. On the great majority of those farms which regularly have small losses, and frequently large ones, it would be advisable and easily practicable to dose every sheep at monthly intervals each year, commencing at the beginning of October and ending early in April. Under such a system the farmer might be assured that his loss from liver rot (other than from "acute" cases, which must soon disappear where such a system is practised) would be cut out. Each year, fewer and fewer snails would have opportunity to become propagators of the disease. He might well look forward to the time when dosage at such regular intervals, at least following normal summers, would be unnecessary.

Following wet summer seasons, dosage at monthly intervals should always be carried out on farms which suffer any loss from liver rot. There may be seriously menaced farms on which difficulties of collection or other considerations make it reasonable to vary the system after normal seasons to dosage at intervals of two months. On less seriously affected farms, it might be reduced to dosage on two occasions, probably once early in December and again in March.

When the existence of liver rot is detected in a flock, every member should be dosed at once, and this treatment repeated at monthly intervals until the whole of the original infestation has certainly been cleared. If, after diagnosis, opportunity for infestation still exists, the monthly administrations should be continued until April.

(*b*) *The Use of Drugs in other Animals.* The study of the value of drugs in the destruction of liver flukes infesting cattle has not reached the stage which will permit the recommendation of systems of dosage comparable with those recommended for sheep. Norris found certain doses of male fern of value, and "Danistol," given in the doses recommended by the manufacturers, also appears an efficient remedy. Carbon tetrachloride appears to be rather a dangerous drug for cattle and cannot, at present, be recommended.

The prevention of the scattering of eggs by infested rabbits must be attempted along different lines. We cannot induce them to come to a fold for periodic dosage! Ruthless destruction must be advised and should be practised.

SUMMARY. From the earliest times, disastrous epidemics of liver rot, such as those of 1879-80, 1920-21, and 1924-25, have caused widespread and serious loss to British flockmasters. In many districts, loss from this disease occurs even in normal seasons, and even though the *proportion* of sheep affected may not be large the *total annual loss to the nation* is serious.

Although there are still gaps in our knowledge, it is now possible to recommend satisfactory measures, not only for the treatment of affected sheep, but also for the prevention of infestation and for the control of the disease, which if generally adopted would remove the pest from

the list of serious menaces. These recommendations are discussed in the foregoing pages and may be summarised as follows :—

(1) Keep sheep from land which is, or is likely to be, infested with the snails which act as the intermediate host of the common liver fluke.

(2) Drain wet land and open up ditches, keeping their sides as clean and vertical as possible.

(3) Protect such birds as the lapwing.

(4) Dress snail-infested land with copper sulphate.

(5) Administer carbon tetrachloride to sheep under a system which will prevent loss from the disease and also diminish or even prevent the distribution of eggs of the liver fluke.

(6) Keep down rabbits and have infested cattle treated.

Particular consideration has been given to two of these recommendations, the fourth and fifth stated above. Carbon tetrachloride must not be regarded simply as a drug of value in the treatment of sheep obviously affected with liver rot. It has a much higher value, and should be employed to reduce or eliminate general infestation, both current and future. It is now the duty of all interested to aid the application of the measures recommended by those engaged in the study of the control of this disease, that the disastrous results which must otherwise follow in the wake of future wet summer and autumn seasons may be avoided.

Postscript. Since the above was written, observations on the use of carbon tetrachloride in the "treatment" of some 20,000 sheep, located in many counties in these Islands, have been made and reported to the writer. *The dosage recommended (1 c.c. of carbon tetrachloride) has caused the death of sheep in certain flocks fed on artificial food or folded on special crops.* Excellent results have been obtained with sheep grazing natural pasture, and the administration of very large doses to such sheep has produced only transient effects. Until further investigation has explained this remarkable difference it is advisable to dose only a few representative members of the flock, particularly if not on free range, in the first place. Should these subjects show no illness, dosage of the whole flock may be undertaken with safety. If, however, the administration has caused serious illness in any of these sheep, a preparation of male fern should be employed.

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The Toxicity of Carbon Tetrachloride.

Although the toxicity of carbon tetrachloride does not out-weigh its usefulness as an anthelmintic in small animal practice, it is nevertheless essential to keep in mind that there is a limit of safety to face with every dose administered. This fact has been realised since the drug was first used on a large scale following Hall and Shillinger's discovery of its exceptional high potency against hookworms and subsequent announcements relative to its harmful effect on the liver structure.

More recently practitioners have observed that cats are particularly sensitive to this toxic action, the liver being damaged more than that of the dog where the dose computed from body weight is the same. Chandler and Chopra (*Exp. Sta. Record*, April, 1927. *Ext. from Ind. Jour. Med. Research*) confirm these observations and add that in cats the kidneys also undergo harmful degrees of degeneration accompanied by albuminuria, in doses as low as 0.25 c.c. per kilogram of body weight. In a study of antagonists, these authors found that sodium citrate reduces the toxicity and dilute hydrochloric acid increases it. Intestinal alkalinity inhibits and acidity increases the toxicity. In lethal doses, sugar was found to delay death a day or two, but affords no significant protection from a therapeutic standpoint. A sulphate of magnesium purge, as was shown by Hall, when carbon tetrachloride was first introduced, is the best protection according to these authors.

The toxicity of carbon tetrachloride in sheep was pointed out in the discussion on verminous gastritis at the eighth University of Illinois veterinary conference. That fatalities were too numerous to justify its use in sheep practice was the undisputed opinion of several speakers on the subject, notwithstanding its high anthelmintic action as compared with copper sulphate solution.

Carbon tetrachloride has become indispensable in veterinary practice, particularly in the treatment of hookworm infestations now known to be so common in dogs and foxes, but it is regrettable that the wide publicity this drug has received has resulted in the placing of another dangerous drug on the nostrum market along with the other anthelmintics which should never have left the hands of the trained veterinarian, for here is a valuable but poisonous agent whose limit of safety cannot be measured by anyone who is not familiar with a therapeutic complex that taxes the best of us.

Except in the hands of the careful physician or veterinarian, carbon tetrachloride is a dangerous product. It should no more be prescribed as an open market commodity than strychnine or cyanide of potassium.—*North American Veterinarian.*

A farmer was trying hard to fill out a railway company claim sheet for a cow that had been killed on the track. He came down to the last item : "Disposition of the carcase." After puzzling over the question for some time, he wrote : "Kind and gentle."—"Tawney Kat."

Digestive Disturbances of Cattle.*

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It is commonly accepted that accurate records on a series of cases of any disease afford a sound basis for discussion. In the ambulatory clinic of the New York State Veterinary College it is possible to record observations on nearly all common diseases and, on an average, 140 cases of digestive disturbances in cattle are seen yearly. In this discussion I will consider the most common ones treated in the year 1925-26, using the classification shown in Table I.

TABLE I.—*Digestive disturbances of cattle.*

DIAGNOSIS	TREATED	RECOVERED	DIED	COMPLICATED	COMPLICATIONS	SECONDARY TO
Acute intestinal catarrh	17	14	3	3	Traumatic gastritis (2)	Malignant head catarrh (1)
Winter dysentery	96	96	0	0		
Acute indigestion	71	70	1	5	Mastitis (1) Meningitis (1) Traumatic gastritis (2)	Retained placenta (1)
Gastro-enteritis or enteritis	16	5	11	7	Meningo-encephalitis(1) Septic metritis(1) Traumatic gastritis (1)	Hæmorrhagic septicæmia (1) Necrobacillosis(1) Pyelonephritis(1) Septicæmia—*B. pseudomonas*(1)
Traumatic gastritis	43	15	28	15	Gastro-enteritis (1) Metritis (5) Metritis and mastitis (3) Metritis and nephritis (1) Mastitis (1) Pyelonephritis(1) Ruptured uterus-abortion (1)	Acute tympany (1) Ruptured rumen and hepatitis (1)
Displacements	3	1	2	0		
Total	246	201	45	30		

GASTRO-INTESTINAL CATARRH.

Among the cases of primary indigestion, a few are classed as acute intestinal (or gastro-intestinal) catarrh, although they are not particularly different from acute indigestion. They are called catarrh because the result of the food stasis or other cause is an acute, mild, catarrhal inflammation of the abomasum and intestines, while the fore-stomachs are less disturbed than in other types.

Occurrence. Last year this group constituted about 10 per cent. of the digestive disturbances treated. It was seen in cattle of all ages, although when found in very young calves it was classed under diseases of the newborn. The seasonal occurrence last year, like most years, showed that the disease was not seen between the months of July and November. Over one-third of the cases occurred in April.

Etiology. There is a variety of causes, including over-feeding, exposure to cold, cold water, frozen corn stalks, fatigue from being driven, advanced pregnancy (possibly a predisposing cause), sour silage in the bottom of a silo, and over-eating on green oats. There was one case in which it constituted a preliminary symptom of malignant head catarrh and several where the cause was unknown. These cases where the cause is unknown should, according to Hutyra and Marek,[1] be assigned to an infection. If we are unable to locate any error in the diet sufficient to account for the condition, an infection or traumatic gastritis is suspected.

During the last winter we saw 96 or more cases of so-called winter dysentery, in which the *cause* was probably an infectious agent, as it soon attacked many or all of the cattle in a herd and was seen in several herds at once during the winter and spring. This, when seen in an individual cow, is a catarrh of the intestines with persistent dysentery.

In one herd a condition similar to this was seen only in the best producers which were receiving a very heavy grain ration. The grain contained too high a percentage of sodium chloride and apparently caused rather severe intestinal catarrh.

Symptoms and diagnosis. The symptoms in ordinary cases of intestinal catarrh which terminate in recovery are quite variable. There may be dulness; partial or complete anorexia; temperature, 100°-106° F.; pulse, 60-85; and a gradual decrease in the milk flow. The digestive tract usually shows no increase in size, and the rumen is fairly active. There may be an increased intestinal peristalsis with diarrhœa, or a decreased peristalsis with little or no fæces, depending on the causative agent and the time the case has gone untreated. The most diagnostic symptom is the passage of a decreased amount of firm fæces coated with mucous, or of thin fæces mixed with a moderate amount of mucous or blood. In severe cases bordering upon fatal enteritis there may be no fæces, or watery fæces mixed with mucous and blood, passed involuntarily.

In the presence of the above symptoms, and with a history that the animal has been sick only a short time, a correct diagnosis is usually possible. The diagnosis, however, can not be made positively until the termination of the case is known. The cases diagnosed as intestinal catarrh last year recovered, with the exception of three where the condition was apparently only a symptom of traumatic gastritis in two, and of malignant head catarrh in one.

Treatment. The treatment of this type of indigestion is not different from other forms except that it seems that a large dose of some irritant purgative may in certain cases lead to death by enteritis. The most severe case in this group last year was one that had started with a mild dysentery and had been given a large dose of Epsom salts before we were called. We use salts occasionally in this condition, but not when a diarrhœa is present. Intestinal antiseptics (especially creolin, in 6-dram doses, in so-called winter dysentery), stimulants, and liquid petrolatum in doses of one pint to two quarts twice daily, give satisfactory results. In cases occurring on dry feed, a laxative diet of molasses, fresh mangel beets, and bran mashes will aid in hastening the return to normal milk production.

ACUTE INDIGESTION.

Synonyms. Simple or primary indigestion, atony of the rumen, impaction of the rumen or omasum, acute indigestion with tympany.

Primary indigestion is defined as an atony of the fore-stomachs, induced by an overloading of the rumen or reticulum with food or indigestible substances. Depending on the material, it results in impaction of the rumen, tympany or bowel catarrh. Less often, food accumulates in the omasum or abomasum.

Occurrence. About 70 cases of acute indigestion occur annually and these constitute nearly 50 per cent. of the digestive disturbances seen. The seasonal occurrence was somewhat like that for catarrh, in that the largest number were seen in April, and that none were seen in

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August. But it was surprising to find that there were six cases treated in July. There were only six cases each month during January, September and October.

Udall[2] states: "In our experience primary indigestion is practically unknown among grazing cows. For this reason a diagnosis of severe primary indigestion between the months of May to September is made with caution. In this period it is possible for a cow to obtain spoiled food, or unreasonable amounts of food to which she is not accustomed, but these occasions are not frequent and when they do occur are usually recognised."

Of the six cases occurring last July, one was not at pasture. The other five did not have a history of access to unlimited amounts of food but two did have a clover pasture; so that the seasonal occurrence is very variable and is not an absolute guide in drawing conclusions as to a diagnosis. A cow, however, showing symptoms of indigestion while regularly at pasture, should be suspected of having some other condition.

History and etiology. In acute indigestion it is often difficult to obtain an accurate history, but if this is possible it is often more helpful in determining the procedure than any symptoms that the cow may show. It is essential to make careful inquiry regarding the character of the food, the number of days the patient has shown anorexia, the amount of decrease in the milk flow, the suddenness with which lactation ceased, and regarding previous attacks of indigestion. Almost invariably if none of the well-known causes is given, and the cow has suddenly shown a decrease in the amount of milk with anorexia lasting several days, a careful examination will reveal some condition to which the apparent indigestion is secondary.

Studies of the foods and changes in diet in the cases considered showed that there were no cases due to unlimited eating of such heavy grains as ripe buckwheat, wheat and corn; but a few did consume large amounts of oats, both whole and ground. In former years the cases which terminated in death by gastro-enteritis were those that had over-eaten on such heavy material as buckwheat and corn, while those last year made a prompt recovery after eating oats.

Symptoms. In cattle with acute indigestion any unusual attitude may be expected. The majority of cases are depressed, but a few show nervous symptoms by champing the jaws, with salivation that resembles foaming at the mouth, or by assuming an unusual position on the knees, with the rear parts in the normal position. Others show the effects of intoxication on apples and other foods by staggering, and a few are completely paralysed and lie prostrate as in parturient paresis. If there is a tendency to continue to lie down in a normal position for several days it is suggestive of traumatic peritonitis or dropsy of the fœtal membranes.

Great importance has been assigned to the other general symptoms in making a diagnosis in obscure cases. In this group of 70 cases the temperature ranged from 100°-105.5° F., but in the majority of cases it was 103° or slightly above. The pulse rate was above 100 per minute in only four cases, and 30 per cent. of the cases were recorded as 80 or more, so that in about 70 per cent. the pulse was less than 80 per minute. An examination of the mucous membranes and other general symptoms were not particularly useful since little change was present.

A digestive disorder is usually suspected by the owner because of anorexia, absence of rumination, and changes in the fæces. Careful examination of the digestive system nearly always shows that the contractions of the rumen are decreased in frequency, unless it is a case of acute tympany, when the rumen is often hyperactive for a time after the gas is removed. The consistency of the rumen is most often doughy or firm, but when green, fermentable materials are present there is an unpleasant combination of soft food mixed with gas. The size of the abdomen varies with the cause, and the time of observation. Intestinal peristalsis is variable, and the fæces are usually firm and sparsely passed. Diarrhœa is not infrequent soon after the ingestion of large amounts of green food.

Diagnosis. Much has been written about the diagnosis and differential diagnosis of indigestion, but it is agreed that most typical cases of indigestion may be diagnosed by the symptoms just mentioned, and that an early positive diagnosis of such other diseases as traumatic gastritis is impossible by the symptoms seen at a single call early in the course of the disease. The course, or the time required to effect recovery in a case, and symptoms that may develop later make a diagnosis possible.

There are many other conditions that need to be differentiated, such as parturient paresis, mastitis and metritis. In these, atony of the digestive tract is usually secondary. The date of parturition and condition of the udder and uterus should be considered carefully. One case last year, showing tympany and colic, was also a trifle wobbly in her rear parts when walked. She was able to get up and lie down easily and frequently. She had calved normally the day before. Inflation of the udder and a small dose of stimulants gave prompt recovery. We believe that medication orally in these cases might be dangerous and that collapse would follow if the udder were not inflated. These secondary symptoms of indigestion will frequently disappear after an infected udder is given attention, or after an accumulation of exudate in the uterus is removed. Such cases require careful diagnosis in dairy cattle.

Treatment. Stimulation of the whole system, especially the digestive apparatus, along with the use of laxatives, anti-ferments and carminatives, gave satisfactory results last year. Stimulation was produced in various ways, but strychnine sulphate in one-grain doses, at four to six-hour intervals orally, was nearly always used, until anorexia ceased. Camphorated oil intramuscularly, aromatic spirits of ammonia or ammonium carbonate cubes orally and subcutaneous doses of strychnine were also employed when needed. Barium chloride and tartar emetic in doses of one to four drams daily, in combination with Epsom salts or liquid petrolatum, were used to stimulate and unload the digestive tract.

Large doses of Epsom salts or barium were seldom given in cases where there was evidence of weakness or diarrhœa, or where the cow had been purged by the owner before we were called. Many cases that are bordering upon an enteritis will improve when given repeated doses of liquid petrolatum, pine oil, capsicum, and much stimulation. And if there is inability to stand, the udder is inflated, as a further means of stimulation.

Trocarisation was required in over 5 per cent of the cases and in some, where the tympany persisted, we inserted pine oil, or dilute creolin solution through the canula directly into the mass of food in the rumen. No further surgical interference was needed in these cases, but in previous years a few have required rumenotomy.

Gastro-Enteritis: Enteritis.

By gastro-enteritis we mean those cases of inflammation of the stomach (particularly abomasum) or intestines with severe hæmorrhage or necrosis of the mucous membranes. These lesions are what we aim to prevent in the treatment of primary indigestion.

Occurrence. Enteritis was seen as often as intestinal catarrh, but was often secondary to some other fatal disease. It was frequently impossible to decide whether the enteritis was secondary or primary. Last year the seasonal occurrence of this condition was not instructive, as one or two cases occurred each month except August.

Etiology. The cause in a quarter of the cases was unknown and was indefinite in many others. It was evident that infection played an important part in causing enteritis. Cows showed gastro-enteritis last year as a symptom of septicæmia due to the following organisms: *Actinomyces necrophorus, Bact. bovisepticus, B. pyocyaneus, B. nephriditis bovis* and the infections of septic metritis. It was seen also as a symptom of septicæmia from traumatic splenitis.

Irritants are said to be an important cause of gastro-enteritis, and one case was definitely due to the use of too much Epsom salts in a yearling heifer that was treated for

indigestion by the owner. In other years we have seen it following ingestion of arsenate of lead and other irritants. Food apparently caused it in a few cases last year. Too much milk and a diet of sour skim milk proved fatal to two calves. It has often followed severe indigestions in previous years, but no cases last year could be assigned to this cause.

Symptoms and diagnosis. It is not difficult to determine that enteritis is present by observing the well-known symptoms, but it is difficult to determine what *other* conditions are present. The majority of cases show depression, normal or subnormal temperature, a fast weak pulse, sunken eyes, anæmia of the visible mucous membranes, with marked weakness, staggering or inability to stand. The digestive tract is paralysed and very little is heard on auscultation of any part of it. Slight soreness over the abomasum or intestines is sometimes present. The fæces are watery or mixed with much mucous and blood and passed involuntarily, or often there are no fæces passed.

Often in infectious diseases such as hæmorrhagic septicæmia or necrobacillosis the temperature is high, but the other symptoms are similar to those seen in severe enteritis. The diagnosis is therefore not always possible in the living animal, since she may show principally enteritis, and die from a septicæmia due to various causes. Half of our cases which showed marked gastro-enteritis were suffering from some disease of much more importance to the rest of the herd. The only way to clear up the diagnosis in these cases where a diseased kidney, necrobacillosis, hæmorrhagic septicæmia, septic metritis or mastitis, or traumatic gastritis is the principal cause of the disorder, is by examining all the systems instead of the digestive system alone. But frequently even an autopsy and laboratory examination of tissues leave one in doubt as to the primary cause of the disorder that terminated in gastro-enteritis.

Treatment. Obviously treatment is difficult when it is impossible to reach an accurate diagnosis. We try to treat the underlying cause if that appears to be metritis or mastitis or hæmorrhagic septicæmia. If the gastro-enteritis is a sequel to indigestion we rely on protectants such as liquid petrolatum, bismuth subnitrate and tannin, and use stimulants. In young animals anti-hæmorrhagic septicæmia serum was used in some cases where the diagnosis was uncertain. Of the sixteen cases diagnosed as gastro-enteritis, five recovered. Two of these were given great quantities of oatmeal gruel, eggs and milk in addition to stimulants, protectants and astringents. Of the eleven cases that died, seven showed serious complications.

Traumatic Gastritis.

Traumatic gastritis was the diagnosis when it was suspected that there was a perforation of the entire wall of the reticulum by a foreign body with resultant adhesions. In this discussion it is admitted all cases classed as traumatic gastritis may not have been suffering principally from that condition, and therefore the cases that received the diagnosis of traumatic gastritis have been placed in one of the four following groups:—

First, there were four cases diagnosed rather positively as traumatic gastritis in which *no foreign body was present.* All four showed many of the usual symptoms of traumatic gastritis but each was autopsied. Two which had shown symptoms of parturient paresis early in the course of their illness finally died of septic metritis, although traumatic gastritis had been strongly suspected.

A third died of pneumonia after showing subcutaneous emphysema for several days following an accident. A fourth was killed because of emaciation and weakness after several weeks' sickness. She had shown a high pulse and soreness over the reticulum, but autopsy showed a mitral thrombosis. This group which we know was incorrectly diagnosed constitutes less than 10 per cent. of traumatic gastritis cases.

The *second* group includes those fatal cases where there was *another condition* present that may or may not have been *secondary to the traumatic gastritis.* In this group an autopsy is essential because it often excuses the veterinarian for losing the case of metritis or indigestion when a nail or wire that has done more or less damage is found. Nine, or 20 per cent. of the cases of traumatic gastritis had important complications as follows: metritis with uterine rupture; metritis with abscesses in the kidney and peritonitis; septic metritis (four cases); hepatitis and rupture of the rumen and acute indigestion with tympany in one that was found dead. These six cases with fatal metritis suggest that an infection may enter the blood from a traumatic gastritis and localise in the uterus, and this has apparently occurred each year in many of the fatal metritis cases.

In the *third* group are those that show rather typical symptoms of traumatic gastritis, but the exact nature of the disease is left to speculation, since recovery occurs. Fourteen cases, or 32 per cent. of the cases diagnosed as traumatic gastritis, have remained alive for several months although two are developing arthritis at the present time, and others may have trouble at any time, especially at later parturitions.

In this group also there were two cases of metritis, one case of mastitis and two cows with both conditions. One of these cows suffered from a severe metritis after retained placenta, but recovered and milked well. Suddenly she developed a persistent mastitis in all four quarters and was then killed as beef. She was very fat, but *post mortem* inspection showed an abscess from a foreign body. It was located anterior to the reticulum and contained a litre of fœtid pus.

In the *last* group are typical cases of traumatic peritonitis or pericarditis. Frequently there is in these a history of slow movements while with the herd, repeated attacks of indigestion that are slow to recover when treated, and gradual emaciation. The pulse is usually above 80, but the temperature is variable, often being high, an abscess of the spleen, or pneumonia. There is usually marked soreness on percussion over the heart or xiphoid cartilage. Subcutaneous œdema ventral to the neck is often seen if pericarditis exists. Œdema was noted in the three cases showing pericarditis on autopsy. A muffled heart sound or an abnormal splash may be noted by auscultation of the heart.

This group included sixteen cases, or 38 per cent. of those called traumatic gastritis, and all except one were fatal. The case that recovered developed symptoms of indigestion with a swelling posterior to the left elbow on the thoracic wall.

A few weeks later a darning needle was removed from this abscess. Another case was operated through the rumen and the foreign bodies removed, but a large abscess in the spleen with peritonitis and general sepsis made this case hopeless. Perhaps a few others could have been improved by an operation. The operations described by Dr. J. N. Frost give cases in this last group their only chance for recovery.

A recent paper and demonstration by Dr. J. K. Bosshart[4] further substantiate the belief that we might have saved a few carefully selected cases by a laparotomy and rumenotomy. He reported that twenty-five cases that were seriously ill were operated through the left flank, the adhesion located between the reticulum and other tissues, and the foreign body removed through the rumen, or it was removed from the peritoneal cavity. Nineteen cases, or 76 per cent., recovered. It may be possible that a large percentage of these cases would have recovered without an operation, since 38 per cent. of those which we diagnosed as traumatic gastritis recovered. But the percentage of recoveries in those operated by Dr. Bosshart is much higher and he was able to make a positive diagnosis and to remove the foreign body. Our greatest difficulty lies in knowing when to operate. The patient shows so little that we feel that it is doubtful if a foreign body is doing much harm, or the case is so severe that an operation would be fatal. In selected cases these operations deserve a trial.

Displacements.

It is a well-known fact that displacements involving the digestive tract, with the exception of intussusception, are

rare in cattle. None occurred during the last year, but the following brief case reports describe a few of the displacements seen in cattle during the last four years.

Case 1. A yearling grade Holstein heifer developed colic and was not examined until three days later. At that time there were marked depression and symptoms of septicæmia, with a subnormal temperature and no perceptible pulse. Heart rate was 88. Rumen was bloated slightly, and the digestive tract completely paralysed. On autopsy 24 hours later an *incarceration of* 18 *inches of the small intestines* was found. This was incarcerated by an old peritoneal adhesion of unknown origin.

Case 2. A four-year-old grade Holstein cow showed anorexia and stepped about with rear legs for a few hours. She passed a scant amount of fæces for 36 hours and became depressed. On examination there was little noted except that there was little action over the digestive tract. A rectal examination showed a hard mass of intestines that had undergone *intussusception*. The involved portion was removed the same day and the cow has been used as a milk producer for two years since that time.

Case 3. A month-old pure-bred Guernsey heifer was given a change of diet and in a few days developed anorexia and marked depression. Temperature, 100° F.; pulse, 105; with the patient recumbent and weak. The rectum was dilated and only serum and mucous were passed. The calf died three days later, and autopsy showed *torsion of the abomasum*, involving the reticulum and omasum somewhat, at the place of the twist. The duodenum was occluded. This condition is mentioned by Hutyra and Marek.[5]

SUMMARY.

1. According to our *data* very few cows die of primary indigestion.

2. There are at least twelve different complications, including infectious diseases, and some of these conditions may be differentiated from indigestion only by following the cases to autopsy.

3. Digestive disorders in cattle, especially traumatic gastritis, offer an interesting field for the application of surgical methods of diagnosis and treatment.

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[4]Bosshart, J. K.: The early diagnosis and treatment of traumatic gastritis (peritonitis) in cattle. *Corn. Vet.*, XVI. (1926), 4, p. 257.

[5]Hutyra & Marek: Idem, p. 161.

Colours of Farm Animals.

"Farmers would repudiate the suggestion that they choose their livestock on æsthetic grounds. None the less there is a pretty accommodation between the colours of many typical English farm animals and the landscapes which present themselves to the townsman's eye. Only the Channel Islands breeds, which belong geographically to the Continent, wear those coats of æsthetically faded shades of fawn and grey and dun which blend naturally with the sun-tanned pastures of a fiercer climate. In most English summers our fields, as now, are vividly green; and most of our cattle are of downright and unsophisticated colours—either white or black or red—which are in harmony with this fresh green setting, and combine with it to give a pleasing impression of natural vigour. A red Shorthorn grazing in a green meadow calls up associations of those showery English skies and that luxuriant English vegetation for which farmers in hotter climates often wish in vain. Jersey cattle, for all their attractiveness, wear the paler livery of bovine races that over most of their range endure summer sunshine which bakes the grassland to the colour of the macaroon, and would make the cheery brightness of a Devon or Lincoln Red herd seem a palpable discord.

"The preponderance of so cheerful a primary colour among English herds seems all the more fortunate a development when we recall that the original wild forest oxen seem to have been dusky. The colours of our cattle appear to have become clarified as their pastures were improved; red cows grew up with the nutritious herbage which they decorated. Sheep in Britain do less to brighten the landscape; vermilion-tinted fleeces remain a showyard sophistication or a poet's dream. But sheep do even more than cattle to embellish their pastures by diversity of form. The contrast between the horned and the hornless breeds is greater, and so are the differences of portliness and agility. Even an ox from South Devon looks less elephantine in the presence of a Kerry heifer than a ringleted Lincoln or massive wether from Romney Marsh beside a trim Southdown or an agile Welsh mountaineer. The exploring Cockney will be grateful to the singular turn of the market which has resuscitated, almost from the brink of extinction, the old Wiltshire sheep, now known better as the Western Horn. He may not be interested in the causes of this revival, though as a consumer he shares the responsibility for them; but he feels an animated satisfaction at the reprieve and multiplication of an animal with so nobly horned a head. Pigs will attract him or leave him indifferent for reasons which the farmer scarcely shares. He favours the out-door method of rearing pigs because, when they interest him, he can observe them better than in a sty. He will remain a supporter of the Tamworth breed because a pig which is red like a flowerpot attracts him; and he will repudiate any suggestion that a breed so picturesque and parti-coloured as that either of Essex or Wessex is a superfluous survival. If new breeds of livestock are to be introduced, he will hope that a committee of taste, other than merely gastronomic, may have a hand in choosing them. Even the most celebrated recent addition—that of Friesian cattle—may not altogether satisfy him; for, although their bold mixture of black and white befits a North European stock, there is a freakishness in their spashes which suggests to him a map of the islands of their nominal origin rather than the simple though full-blooded rusticity of a right English herd."—*The Times.*

The Agricultural Returns.

"The first instalment of the Agricultural Returns for 1927, published by the Ministry of Agriculture last week, is of especial interest because of the critical period in the history of the farming industry the figures represent, . . ." says *The Times* of August 15th.

"In livestock the position is reassuring. The figures relating to cows and heifers, in the cattle section, indicate a recognition that the wise margin was exceeded last year, and the small reduction in heifers-in-calf suggests an attempt to restore the balance. The diminution in animals under one year old may easily be the result of the sharper demand for veal, owing to the exclusion of Continental supplies. There are more cattle in England and Wales now than ever before. The distribution of the herds in June is influenced by meteorological conditions, among others; hence, probably, the smaller totals this year in the grazing counties, where drought, as well as scarcity of money, may have retarded the stocking of the pastures.

"The gain in sheep is another pleasing result. In this case, even more than in cattle, the figures scarcely do justice to the development, because of the progressive increase in the number of lambs sold fat before they can be enumerated on June 4th. The rapid progress in early maturity explains any changes noticeable, and indeed, cannot be fully measured by any figures collected at a given date. Except that the lighter breeds, or smaller strains of the same breeds, are gaining ground on the heavier classes, the position of the pastoral pursuit would appear to be satisfactory. A new level in pig production has not quite been reached, but progress in that direction is noted, and an interesting feature of the increase in sows is that every county has contributed to the result. A falling off in the number of agricultural horses is a natural corollary of the reduced areas under cultivation, but the rate of decrease in the breeding of heavy types has slackened appreciably."

The Veterinary Record.

27th August, 1927.

LIVER FLUKE DISEASE RESEARCH.

Nothing is more gratifying than the expansion of veterinary research in this country in recent years. The results have been helpful to the practitioner and beneficial to the intelligent stockowner who have sought their aid. In this connection may be mentioned the work done on liver fluke disease of sheep. The prevalence of this disease in the wet season of 1924 gave a stimulus to research which we are glad to note has been utilised. In a paper which we publish in this issue, Mr. R. F. Montgomerie gives an excellent summary of the work done, and how the results obtained can best be applied in combating this scourge of animal husbandry.

It is clear that the parasite generally responsible in the British Isles is the *Fasciola hepaticum*, and that the adult flukes in the liver of sheep can readily be destroyed by male fern and carbon tetrachloride in suitable doses. Our knowledge of the specific action of these drugs has hitherto been mainly used in the treatment of infested animals showing clinical symptoms, and not sufficiently as a means of prevention. This is mainly due to the attitude of stockowners, who are apt to concentrate on the clinical manifestations and to overlook factors of causation in parasitic diseases. In liver fluke disease preventive measures come first in importance. These are clearly described in the paper to which we refer, and it is by a selective application of the measures suitable to the needs of each case that satisfactory results will be obtained. In some cases drainage may be impracticable, in others the state of the pasture may not favour the application of copper sulphate, or the range may be so extensive and inaccessible as to put means for the destruction of the host snails out of question. In nearly all circumstances, however, good use can be made of the anthelmintics mentioned by monthly dosing during the Winter and Spring months with the object of diminishing the distribution of fluke ova. To expect satisfactory results, this work must be thorough in its application to all sheep and cattle on the farm, and new entrants should, of course, be free from flukes. Sufficient experience with this line of prevention has not yet accumulated to assess its value, but if it proves sufficient to prevent gross infestation, and the consequential "acute" cases, it will have accomplished much.

In the selection of an anthelmintic, carbon tetrachloride appears to have many advantages over male fern. The recent mortalities with the drug in sheep receiving artificial feeding must be kept in mind, and due precautions taken. It may be noted that carbon tetrachloride does not appear to be toxic in every case where an animal is receiving dry food; indeed, sheep receiving a ration of cake may show a normal tolerance; further experience on the point is required. Therapeutic doses may be given with safety to infested cattle at pasture which are not showing advanced symptoms of the disease.

There are still aspects of the liver fluke problem which require further research—the invulnerability of the immature flukes, for example; and sufficient work has not been done in the way of experimentally infesting sheep with cercariæ and following up the effects on the animal, and the progress of the parasite, on the vitality of fluke ova under natural conditions, and on the rôle rabbits play in the upkeep of the disease. Until this work has been accomplished we can hardly assume a complete understanding of the laws of prevention.

"Handbook for Veterinary Surgeons."

(Preliminary Notice.)

Mr. Fred Bullock, Secretary of the Royal College of Veterinary Surgeons, has made a notable addition to his record of service for the profession in preparing a *multum in parvo* medium of information under the above title.

It will be our pleasant duty to review the work in an early issue; for our present purpose of commendatory announcement we beg leave to quote from the preface contributed by Sir John M'Fadyean, in the course of which he says:—

"The predominant feeling of the writer of this Preface, after he had been allowed to read the Handbook in its manuscript stage, was one of surprise that it had not been published long ago, and his abiding opinion is that the author has laid the veterinary profession under a debt of gratitude for having provided within comparatively small compass a mass of information that will be of the greatest importance to the younger members and is not readily obtainable from any other source. . . .

"Although the book will be specially valuable to the younger members, it is highly desirable that every member of the profession should be in possession of it."

Within the narrow compass of 96 pages—a size which, incidentally, enables the price to be fixed at the ever-ready sum of half-a-crown, Mr. Bullock has found room to deal with clarity and with a remarkable degree of adequacy with every important aspect of the matters

summarised in the headings of his chapters, which are as follows:—"Administration of the Profession"; "Rights and Duties"; "General Practice"; "Legal Responsibilities,"; "Post-Graduate Training"; "Taxes" and "Government Services."

Orders will now be accepted by the publishers, and the book will be available for purchase from the Local Secretary's Office, Torbay Hotel, Torquay, during the forthcoming Congress.

[**Handbook for Veterinary Surgeons**, by FRED BULLOCK, LL.B. (Lond.), of Gray's Inn, Barrister at Law; Fellow of the Chartered Institute of Secretaries; with a Preface by Sir JOHN M'FADYEAN, LL.D., B.Sc., M.B., C.M., M.R.C.V.S., Principal and Dean of the Royal Veterinary College, London; Past-President of the Royal College of Veterinary Surgeons. Taylor and Francis, Red Lion Court, Fleet Street, E.C.4. Price 2s. 6d. net.].

COLOUR AND EXPRESSION IN CATTLE.

"It is true, as an American writer remarks, that judges of cattle pay close heed to the coats and expression of the animals they buy. Referring primarily to Herefords, the said writer says that the quality of the coat of hair is an index to the quality and texture of flesh. If the coat is coarse, or wiry, or harsh, it indicates a lack of quality in the flesh. These features apply as definitely to fattening or grazing as to breeding animals. The attention that successful owners pay to the colour and quality of the coats of cattle is fully justified by the merits, or demerits, these denote, and buyers of commercial animals also would be well advised to have due regard to the features that count for so much with the breeders on registered lines. The head and expression of animals also are studied with exacting regard to what they imply. As the American writer puts it, 'the cattle feeder, and more especially the cattle breeder, must look into the faces of his cattle to find the stamp of improvement left by good beef ancestry.' While the head, the face, the coat, and other outward features reflect the lineage of animals, it will be safe to infer that they foretell with a high degree of accuracy the ability and fitness of an animal to reproduce its kind in the breeding herd."—*The Times.*

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Royal Veterinary College Championship Dog Show.

THE SPILLERS' GOLD CUP.

We reproduce an illustration of the Spillers' Cup, of solid gold and of the value of fifty guineas, which is for open competition at the forthcoming Royal Veterinary College Championship Dog Show, to be held at the Crystal Palace, October 27th-28th.

The Spillers' Cup is to be won outright at the above event by the owner of the best dog or bitch in the show. The trophy is perhaps the most valuable, and is certainly the most handsome, of any Cups which have ever been offered at a dog show, and the winner will enjoy, also, the honour of receiving the Cup from the hands of H.R.H. Princess Mary, Viscountess Lascelles, who has graciously promised to be present on the second day.

The Royal Veterinary College Dog Show, which is being benched and fed by Spillers, has for its sole purpose the raising of funds for the reconstruction of the Royal Veterinary College. Donations will be very welcome, and should be sent to the Hon. Secretary of the Show, Mr. E. T. Cox, 81 Elsham Road, Kensington, W.14, from whom also full particulars about the letting of stand spaces, entries, etc., can be obtained. Schedules will be available at an early date.

CLINICAL AND CASE REPORTS.

A New Therapy for Ascites in Dogs.*

By E. L. QUITMAN, D.V.S., and A. M. EHLE, D.V.M., Chicago, Illinois.

Patient.—Country-type shepherd, male, two years old.

History.—The patient had been declining for at least one year and the abdomen enlarging for over two months. The diet had been mainly table scraps consisting largely of starchy ingredients (bread, potatoes, rice, etc.) and very little meat. The dog was first seen May 20th, 1927, when it had to be carried into the hospital.

Examination.—The examination showed the patient to be very weak and depressed; moving about was accomplished with difficulty; the hind legs were œdematous; the pulse scarcely perceptible; and abdomen pendulous and greatly distended.

Diagnosis.—Abdominal ballottement by having the patient held up in the standing position, the examiner placing the left hand firmly against the left side of the abdomen and tapping gently on the right side with the finger tips of the right hand, produced a distinct wave that was felt by the left hand. The diagnosis was ascites.

Treatment.—Although the abdomen was distended to a degree where evacuation of the fluid content seemed imperative, we did not resort to that measure, having acquired confidence in the merits of novasurol (sodium mercurichlorphenyl oxacetate with diethylbarbituric acid), a "New and Non-official Remedy" containing 33·9 per cent. of mercury. The dose ranges from 0·5 c.c. to 2 c.c. of a 10 per cent. solution injected intramuscularly at 3, 5 or 7-day intervals, depending upon the progress of the ailment.

An injection of one 1·2 c.c. ampoule of novasurol solution was given intramuscularly in the right gluteal region. In addition, 5-grain tablets of ammonium chloride were dispensed, with instructions to administer a 15-grain dose three times daily. The owner was instructed to bring the patient back for another injection on the fourth day (May 24th) and meanwhile to feed nothing but raw beef.

On May 24th there was a noticeable improvement; the patient was able to walk into the hospital and was brighter in appearance and the œdema of the hind legs was disappearing. The owner reported that the dog had passed urine copiously on returning home after the first injection. This condition continued during the greater part of the succeeding day (May 21st), after which there was a marked decrease, although the quantity of urine voided was reported to have remained above normal.

There was less fluid in the abdominal cavity and the pulse and respirations were approaching the normal rate. A second injection of one 1·2 c.c. of novasurol solution was given into the left gluteal region and instructions given to continue the ammonium chloride and the raw beef diet. We also requested that the dog be brought back three days later (May 27th).

On May 27th, the pulse and respirations were normal and the hind legs of natural size. The abdomen was almost normal in size and contained very little fluid. The dog was more lively, jumped about, barked his thanks and wanted to play. A third injection of one 1·2 c.c. of novasurol solution was given in the right gluteal region and the ammonium chloride and meat diet continued as before. Less urine had been voided than during the previous interval, the owner said. We now requested that the dog be brought back in five days (June 1st) for further examination and treatment.

On June 1st, the owner reported that the dog had been more lively and showed every sign of feeling better, and this was borne out by the examination which also revealed but a slight trace of fluid in the abdominal cavity. The abdomen, however, retained a slightly pendulous conformation. The quantity of urine voided was reported to be slightly above normal. A fourth injection of one 1·2 c.c. ampoule of novasurol solution was given in the left gluteal region and the ammonium chloride and meat diet continued.

On account of the remarkable improvement we requested the owner to return the dog only after an interval of seven days (June 8th).

The dog was, however, not brought in until the eighth day (June 9th) when the examination showed no abdominal fluid present. The pulse, respirations, hind legs, and quantity of urine voided were normal, and the dog was full of "pep." A fifth injection of the same dose was given in the right gluteal muscles and the meat diet and ammonium chloride continued. The patient was not seen again for two weeks (June 23rd).

On June 23rd the dog was normal in every respect. However, a sixth injection of the same dose was given in the left gluteal and the meat diet and ammonium chloride continued, but instructions were given to discontinue the latter in about ten days and also that no further treatment would be required unless the ascites recurred.

In making this report we do not wish to convey the idea that this proprietary remedy is a specific in all cases of ascites, but we do wish to call attention to the fact that it offers some hope of success where the usual methods of treatment hold out no hope.

Another interesting point in connection of this case is the age of the dog, as such grave symptoms are seldom seen in dogs of that age. The rapidity of the recovery is also worthy of notice, since a marked improvement was shown four days after the first injection and in thirty-four days the dog was normal in every respect. Additional reports in regard to this line of treatment would be of value. Thus far, in all cases where we have employed this treatment the results were exceedingly favourable and if there have been any recurrences they have not been brought to our notice.

* Reprinted from the August issue of *The North American Veterinarian.*

"Fright Disease."

Captain Elwood L. Nye makes the following breezy contribution to a recent issue of the U.S. Army *Veterinary Bulletin*:—

The various veterinary journals have recently published articles in which "fright disease" is classed in that all-embracing mystery "deficiency disease," and the cause is laid to a dearth of fresh meat in the diet.

This may, or may not, be the true cause. One wonders.

The writer endeavoured to see what he could see, and while it is realised that one cannot generalize from one case, and that a single incident is not conclusive, yet the following case report is submitted for what it may be worth, if anything.

In October, 1925, the writer was presented with a Boston Bull of proud and ancient lineage, age one month. True "Mayflower" corpuscles flowed freely in his circulatory system, and he appeared to be well endowed for life's vicissitudes. It was early determined that this pup should be a model of all canine virtues, and that his diet and general management would be as near to "Hoyle" as possible.

For the first month, or until the pup was about two months old, the diet consisted largely of good whole milk, with small quantities of finely shredded meat. From the age of two months on, the diet was beef boiled with rice, whole milk, raw beef in the form of hamburger, and bones for the benefit of his teeth, or anything else that appeared to need benefitting. Feed was given regularly three times daily, and the dog was so handled that it is reasonably certain that he did no foraging on the side.

His general health was watched with anxious solicitude, and all that loving hearts and hands could do was carried out. He was never allowed to indulge himself in any of the various intestinal star boarders, to which dogs often become so attached; he was vaccinated against rabies and canine distemper; he was bathed without mercy; he was exercised on a leash, and was never allowed to demean himself by association with common garden varieties of dogs.

All went well, and "Bosco" continued in perfect and effulgent health. He was proudly cited by the writer as a shining example of what careful scientific care could accomplish in the rearing of an orphan dog. This state of well-being continued until the age of eight months, then, alas for human hopes and cherished ambitions, we are but subject to bitter disillusionment!

The owner was sitting on his porch calmly enjoying the peace and beauty of the evening, Bosco sat peacefully at his side, reflectively scratching a flea which appeared to be a victim of insomnia, and all was well.

Suddenly, and without the slightest warning, the solemn hush of eventide was rent with a wild and anguished canine yell, and Bosco was "off."

He proceeded rapidly and methodically and with strict attention to detail to put on the picture of "fright disease" in its most violent form. He ran violently until he hit something large enough to stop him, he howled, and screamed, he jumped high and often, he foamed at the mouth, his eyes were dilated, and the hackles stood erect. He went through the writer's quarters like an angel of death, and was finally secured under the bath tub. He was tied, and a start was made to take him to the hospital, but death relieved poor Bosco, before the hospital was reached. The time from the very first symptom until death could not have been over 20 minutes, and there was never a preceding attack.

If this was a deficiency disease, then deficiency is as sudden and fatal as strychnine poisoning. However, a meat deficiency cannot be established in this case, since meat in two forms, cooked and raw, formed a regular part of the diet. If this condition was a manifestation of distemper, as has been claimed, then distemper is becoming entirely too precipitate for comfort, and will have to be treated on the run.

The writer has seen and treated many cases of this condition, some have completely recovered, and others have died, and it is the writer's opinion that no true explanation of the cause has yet been given.

ABSTRACTS.

[**Studies of the Movements of the Eyelids of Animals: Blinking.** W. P. Blount, Department of Physiology, Royal (Dick) Veterinary College, Edinburgh. *Quart. Journ. Exp. Phys.* 1927. XVIII. pp. 111-125.].

The subject of the movements of the eyelids of animals does not appear to have been investigated hitherto. Darwin, in "The Expression of the Emotions in Man and Animals, 1904," mentions "blinking" and "winking," but does not include them under a separate heading.

In order to arrive at conclusions of a definite nature regarding the physiology of blinking, it was decided to make as many observations as possible on different species of animals. It was found that certain animals blink rapidly, some slowly, and others not at all, and that, in addition to blinking, animals use their eyelids in numerous other ways. These have consequently to be differentiated as follows:—

A *blink* is a temporary closure of both eyes, involving movements of the upper and lower eyelids. The pupil is momentarily hidden from view, but the eyeball does not necessarily move its position to an observable extent. A *half-blink* may or may not involve the lower eyelids. The upper eyelids are always lowered and approach the lower lids. A *flicker* is a rapid synchronous movement of both upper eyelids, but not a half blink. A *full closure* of the eyes is much the same as a prolonged blink, but the edges of the eyelids remain together for a considerable time.

Records were not taken when any abnormal condition was present. The time interval between two consecutive blinks, measured in seconds with a stop watch, was taken as the unit; this is the "interblink" period.

The usual theories of the reason for blinking are: (1) To distribute evenly the secretion of the lachrymal glands, and to clear the cornea of foreign material; (2) To allow alteration to take place in the tension of the ocular muscles and thus to eliminate early fatigue; (3) As a protection against injury from the exterior; (4) To guard the eye against continuous exposure to strong light.

It must also be remembered that the upper eyelid lies in contact with the anterior convexity of the cornea. The lachrymal gland is constantly producing its secretion, which is dammed back at the barrier produced by the rim of the lid. During blinking the tears are swept towards the lower eyelid, being distributed over the cornea. Foreign bodies are thereby washed away. On the return of the eyelid a portion of the secretion is re-washed over the eye. Repetition of these movements efficiently keeps the cornea moist and free from dust particles. Blinking has been supposed to vary in rate with the relative humidity or dryness of the cornea, the eyelid movements occurring reflexly from stimulation of this corneal path.

By various means these sources of stimuli, of origin external to the body, were eliminated, and yet certain animals were found to continue to blink. Other sources of stimuli from peripheral organs were observed, *e.g.*, the acoustic path; certain facial movements such as yawning, sneezing, eating, etc.; certain postural movements; but even these could not account for the continuance of the blinking act.

On consideration it would seem that animals may blink as a result of stimuli having a central origin, which probably originates directly from some part of the central nervous

system. It is suggested that these nerve impulses are an excess of nerve energy, manifesting themselves by means of the most facilitated nerve path in the body. This idea of an overflow of nerve impulses is not new ; witness the well-known clinical phenomenon which occurs in the accentuation of the " knee-reflex " when the hands are clasped.

The following are the results of the observations on animals of special interest to the veterinarian. The figure after the description of the animal observed denotes the average " interblink " period in seconds.

Horse, 2·3. The most characteristic movement in the horse is a fine fibrillar hesitating movement of the skin of the forehead in the region of the eyebrow over the inner canthus of the eye. All the movements of the eyelids previously defined occur. As a horse becomes drowsy there are fewer true blinks and flickers, and no full closures. While wide awake there are plenty of blinks, but if the attention is occupied there are few blinks and only flickers. Fixation of attention with visual accommodation stops all movements of the eyelids. A true blink in the horse involves the closing of lids rim to rim, so that the upper eyelashes overlie the lower lid.

Dairy Cow, 2·7. In no animal is the interblink period steady, but under normal conditions in the cow the average period for ten blinks is constant. Physiological variations are striking in this animal. The " pre-rumination " period shows a marked slowing from the normal, *i.e.*, about six seconds ; during the actual chewing of the cud a steady rate of three to four seconds was maintained. Changes during feeding were well marked. While eating turnips the rate increased to about 1½ seconds. During the process of milking the blinking rate slowed considerably to about 7·5 seconds.

Goat, 30. True blinks occur at intervals of thirty to sixty seconds, although flickers are present at a much more rapid rate, *i.e.*, every ten to twelve seconds. As in the case of the dairy cow, during rumination and lactation considerable variation occurs.

Dog, 25. True blinking is not seen in the dog at intervals of less than about half a minute ; flickers however, occur about every 2½ seconds. Until about the tenth day after birth puppies' eyes remain closed, after which the eyelids open, and blinking occurs about every ten seconds. Unlike adult dogs, puppies show few flickers. The acoustic path for blinking is undeveloped.

Cat, 18·5. The movements of the eyelids during blinking are much slower than in most animals, and more of the nature of a full closure than a true blink. Normally the eyes rove about freely, but there is no flickering.

Rabbit. Blinks occasionally but at intervals of more than a minute. The acoustic path is undeveloped. Young rabbits may blink, especially during excitement.

Parrot. 2·3. During the return of the eyelids to the position of rest after blinking it was noticed that the lower lid moved at a much slower rate than the upper one ; this was not seen in any other animal. W. P. B.

[Contribution to the Study of Eclampsia in the Bitch. M. Duclaux, in a thesis for the doctorate, in *Veterinary Science*, Lyons.]

Eclampsia in the bitch is a rather rare disease which has consequently been little studied. Without being as grave as German authors suppose, it may, failing prompt intervention, prove fatal in certain cases.

Most remedies, moreover, give good results. Sedatives (syrup of chloral or ether, camphor bromide, hypodermic injections of atropine, morphine, etc.) have in particular been employed. Cold baths were recommended quite recently by Gueyne.

The author conceived the idea of applying to eclampsia in the bitch mammary inflation, which gives such good results in milk fever in the cow. The technique is a little different, because of certain anatomical peculiarities. The teat of the bitch, in fact, is pierced with numerous small openings, which do not allow the introduction of a probe, even of small calibre. Accordingly, inflation is performed by injection with a hypodermic needle at the base of the teat. The air penetrates into the perimammary connective tissue which it distends, thus compressing from without inwards the glandular acini.

The results are marvellous : the animal is completely cured in ten or fifteen minutes. In the course of inflation a respiratory syncope is often produced, which has no gravity, and yields quickly to artificial respiration combined with rhythmic traction of the tongue.

Finally, " by its simplicity, the facility of its execution, its innocuity and the swiftness of its action, mammary inflation appears to be the ideal treatment for eclampsia in the bitch." (Ex *Revue Vétérinaire*, July, 1927).

R. L. Higgins.

[Exceptional Duration of Gestation in a Cow. Dr. Natili, in *Il moderno Zooiatro*, June, 1926.].

Two cows, mated on April 10th, were examined on February 15th following. One of them had calved on January 28th, after 9 months, 18 days, but the other, after 10 months and 5 days, still showed no preparation for parturition.

Examination of the cow revealed the presence of the fœtus and the author suspected the calf was already dead, and beginning to mummify. But on April 19th, after 1 year and 10 days, the cow gave birth to a well-formed calf.

During his long professional career, the author had met only one similar case in a cow that carried her calf for 10 months and 1 day. (Ex *Revue Vétérinaire*, July, 1927).

R. L. Higgins.

[Sterility following on Granular Vaginitis and its Treatment. M. Getas, in *Recueil de Méd. Vétér.* February, 1926.].

Sterility is the most frequent and the least discussed complication of granular vaginitis. It has been attributed to an excess of vaginal acidity. The author, who studied systematically the reaction of this organ in cases of granular vaginitis, has never observed an acid reaction. He considers, therefore, that injections of bicarbonate of soda, given with the intention of favouring fecundation, are useless.

Of all the remedies tried in the treatment of this disease, thigenol gave M. Getas the best results. Thigenol—in appearance an oily liquid—is an oleo-sulphate of sodium. It is used every four days to paint the vagina. This treatment has permitted the fecundation of cows hitherto sterile. (Ex *Revue Vétérinaire*, May, 1927).

R. L. Higgins.

DIVISIONAL REPORT.

Eastern Counties' Division.

VISIT TO CAMBRIDGE INSTITUTE OF ANIMAL PATHOLOGY.

The very satisfactory number of members who took advantage of Professor J. B. Buxton's invitation to the Eastern Counties' Division to visit the Field Laboratories of the Institute of Animal Pathology at Cambridge, on the occasion of the Summer Meeting, on Thursday, July 28th, spent a thoroughly enjoyable and instructive afternoon. Professor Buxton and his staff not only personally conducted the party round the Institute, explaining the work carried on in the various departments, but also provided demonstrations and exhibits of a nature particularly valuable to practitioners, while the needs of the "inner man" were most hospitably catered for by Colonel and Mrs. W. A. Wood.

The programme commenced with the holding of a business meeting, at which the President, Captain P. R. Turner, was in the chair, and which was also attended by the following:—Messrs. H. R. Allan, T. E. Barcham, V. Boyle, E. A. Burgon, Prof. J. B. Buxton, Messrs. R. L. Cornell, W. F. Howes, W. J. Leyshon, G. T. Matthews, H. Mitton, P. Welch, Col. M. W. A. Wood, Messrs. W. H. Wortley, H. E. Wilkinson, and J. R. Innes.

Visitors.—Mr. C. Townsend and Mr. Norman Wright (Canada).

The receipt was announced of messages of regret at their inability to attend from Messrs. T. G. Heatley, H. Buckingham, J. Hammond, F. Thurston, R. Glover, T. Love, H. Roberts, J. Currie, Major F. Hobday, Messrs. S. Hill, P. Turner, F. Castle, F. Gooch, H. Downe, C. Nesling, H. Standley, junr., C. Tayler, J. Smith, W. Turtill, W. Downie, M. Bray, H. Shaw and W. Shipley (Hon. Secretary).

The minutes of the previous meeting, having been published in the *Record*, were taken as read and were signed as correct.

R. V.C. Re-building Fund.—The PRESIDENT drew the attention of members to the claims of the Fund for the re-building and equipping of the Royal Veterinary College, Camden Town, upon the interest and support of that Division. They had a considerable amount of money in hand and he thought it would be the wish of the members that they should, as a Society, subscribe to the Fund. He knew that several members had, as he had done, taken collecting cards, and had thus made individual efforts in aid of the Fund, but he thought that it would be fitting for the Division to take some corporate action in the matter. The meeting agreed to donate the sum of twenty guineas to the Fund.

Membership Arrears.—The PRESIDENT informed the meeting that their Secretary and Treasurer was gravely concerned because, although the finances of the Society were in a satisfactory state, a number of members were in arrears with their subscriptions for several years and had failed to respond to his repeated appeals for payment. He (the Secretary) desired a ruling as to the action to be taken in such cases, and had sent a list of members whose outstanding subscriptions had not been paid.

After considerable discussion it was agreed that the following rule be added to the rules of the Division: "That Members who are two years or more in arrears with their subscriptions shall, after being notified in writing three times by the Secretary and failing to pay such arrears within fourteen days of the last application, be struck off the list of Members of the Society."

Correspondence.—A letter was read from Mr. F. Bullock returning the warmest thanks of the Council of the Victoria Veterinary Benevolent Fund for the Division's donation of the sum of £5 5s.

New Member.—The unanimous election was made of Mr. J. R. M. Innes, of the Institute of Pathology, Cambridge, as a member of the Division.

Next Meeting.—Mr. H. P. Standley cordially acquiesced in the suggestion which had been received from the Hon. Secretary, and which was warmly endorsed by the meeting, that the next meeting of the Division should be held at Mr. Standley's establishment at Norwich, the proceedings to take the form of operations and demonstrations. The date of the meeting was fixed for Thursday, September 29th.

Votes of Thanks.—The PRESIDENT said that while they were all gathered in that room, and as he might not have an opportunity later in the afternoon, he desired, on behalf of the members of the Eastern Counties' Division, very warmly to express thanks to Professor Buxton, Colonel Wood, Mr. Bosworth and the remaining members of the staff of the Institute for what he was sure would prove to be a very instructive and interesting programme and also for the hospitality and kindness of which they were to be recipients that afternoon. The vote of thanks was passed with acclamation.

Professor Buxton, in acknowledgment, said that the President had adopted a somewhat risky procedure in thanking them beforehand, but they would try to justify it for him. He then outlined the suggested programme for the afternoon.

THE DETECTION OF WORM EGGS IN FÆCES.

Colonel W. A. WOOD then proceeded to give a demonstration of methods of diagnosing parasitic infections of the stomach and intestines of animals.

"The simplest method," said Colonel Wood, "is to examine the fæces. You get the fæces of your sheep, or other animal, take a small portion (about 10 grammes) and make a thin solution by adding water or, preferably, about 10 per cent. formalin solution, which arrests fermentation. Having got your thin mixture, you mix it with a sugar solution—about as much sugar as you can dissolve in water—1 lb. sugar and 16 oz. water. You want to mix about half and half sugar solution with the fæces. A slightly more correct result is achieved if one centrifuges, but everyone does not possess a centrifuge. The mixture is placed in a test tube which is slightly more than filled; this enables one to ensure that the cover glass which one now puts on is touched by the fluid. Leave for twenty-four hours and then take off the cover glass, put it on a slide and examine for eggs under the microscope. Seventy or 80 per cent. of the eggs will rise up in the test tube, because their specific gravity is less than that of the fluid.

"You cannot spot what particular stomach strongyle eggs are present under the microscope, but there is one group you can differentiate and that is the nematodirus of the small intestine of the sheep, their eggs being twice as big as the others. Again, you must not confuse the strongyle eggs with forage acari eggs. If you do not want to wait for twenty-four hours, you can do it quicker by mixing the dung with a saturated salt solution and leaving for an hour, by which means you get a good many worm eggs, but you also find a lot of debris. Liver fluke eggs are not obtained by these flotation methods."

Exhibits Described.

Mr. T. J. Bosworth, speaking of numerous exhibits presented for the inspection of the meeting, said: We have here a few specimens which have proved of interest to us and we thought that some of them might prove of interest to you also. They are mostly examples of material sent to us by practitioners for diagnosis, but some are sent in just as good examples of various conditions.

The first specimen is the heart of a horse showing how enormously hypertrophied it may, in certain circumstances, become. We have no history of the horse.

Then we have two specimens of a very common condition. It is a disease of turkeys known as blackhead, and one of the diseases easiest to diagnose by the naked eye. These are livers of affected birds. Blackhead is especially a disease of young turkeys, and the lesions are mainly found in the liver and intestines, in which the main seat of the lesions is the cæcum. One cæcum, or more frequently both cæca, are found to be filled with a mass of yellowish cheesy material and the membrane is ulcerated. The liver shows a necrosis. The ætiology of this condition is much disputed and is, even to-day, not well understood. It has been ascribed by American workers—it is in America that the greatest amount of consideration has been given to this disease—to two causes. Some hold that the causal agent is an amœba, others that it is a flagellate organism. Those who maintain that a flagellate organism is responsible explain the presence of the amœba-like organism as being some intermediate stage in the life-history of the flagellate.

Blackhead is probably the most serious disease of turkeys in this country. The only curative treatment said to be worth trying is to give doses of catechu in the drinking water. From the preventive aspect it is well to remember that the disease is transmitted from one bird to another by the droppings. The birds have fairly profuse diarrhœa, which is a characteristic symptom of the disease, and the land thus becomes infected and may remain so for one or two years. All precautions should be taken to prevent the admission of any contagion to a poultry-rearing establishment. It is, therefore, of the utmost importance for birds to be bought from clean stock only, and they should be isolated until it is certain that they are healthy. The hen is said to be a carrier of the infection, although hens are not themselves affected. Thus the danger of hatching and rearing turkeys with hens will be readily understood. It is also stated that it is possible for the infection to be introduced by eggs from infected flocks. Infection does not spread through the egg itself, but the egg may be soiled with infected fæces.

This specimen is an example of an ordinary dermoid cyst from the neck of a horse. It is composed of a wall of epithelium with an interior which is a mass of epithelial and fatty bodies in an admixture of hair.

The next specimen is the interior of the œsophagus of a cow, showing a very advanced papillomatous condition of the whole of the mucous membrane.

Here are two specimens showing lesions of tuberculosis in the chicken—the liver, intestines and gizzard. It is a very advanced case indeed, and is rather peculiar in that the gizzard itself is affected—that is not often seen.

This is a case of tuberculosis in the leg of a bullock and, as far as we know, it is a unique specimen. It was sent here by a meat inspector who stated that the carcase of the beast was well nourished and did not show extensive tuberculosis, but he found the nodules in the subcutaneous tissue of the hind legs. On microscopic examination they had the histological appearance of tuberculous nodules and he was able to find the bacilli.

These two specimens show the spleens of the pig and the horse extensively affected with tuberculosis.

[The demonstrator now passed to a description of exhibits relative to a condition rare in sheep—actinomycosis, concerning which a note will later be forwarded by him for publication in the *Record*.—Ed.)

Mr. Bosworth then dealt with exhibits of various lesions of swine erysipelas, including a particularly interesting one of swine erysipelas kidney, and concluded: There is one other specimen here. It is certainly an unusual specimen—a case of streptococcic endocarditis of the pig's heart. The case has already been reported upon by Mr. Cornell (*V.R.*, vol. vii., p. 305). In view of the statement often made that any valvular lesions of the pig's heart are diagnostic of swine erysipelas, it is well to bear this case in mind.

Upon the proposition of the President, a hearty vote of thanks was accorded Colonel Wood and Mr. Bosworth for the lucid way in which they had given their very interesting demonstrations, from which, said the President, all the members of the Division would have learned a very great deal.

The party then proceeded on a tour of inspection of the buildings of the Field Laboratories of the Institute, Professor Buxton explaining at the outset that they had in their organisation as an Institute, both a general research staff and a staff of specialists, and each specialist had his own private laboratory. In addition, they had a general diagnosis laboratory. They would see the various laboratories of the different workers, also routine laboratories where media was prepared and histological work was carried out; they would also see the infectious boxes, glance at the motor laboratory, and then see Mr. Allen's department, which was concerned entirely with the preparation of biological products for the use of veterinary surgeons.

The members exhibited the keenest interest in the many phases of the work which were outlined to them *en route*, and concluded the afternoon at the house of Colonel and Mrs. Wood, who very kindly entertained the party to tea.

W. Shipley,
Hon. Secretary.

STUDENT'S CONTRIBUTIONS.

The Treatment of Colic in the New Born Foal.

By D. E. WILKINSON, Class "D," Royal Veterinary College, N.W.1.

In the early morning of May 8th, 1921, I was called in to attend a hunter colt foal, born the previous day and which was suffering from colic. He showed the usual symptoms of spasmodic pain and impaction of the rectum.

The latter condition was relieved by an enema and by removal of the fæces with a pair of whelping forceps. Scrotal examination showed that there was no scrotal hernia.

A carminative and stimulant of spts. æther nit., spt. ammon. co. and ol. menth. pip. was administered in three ounces of warm castor oil; frequent massage was applied, with the flat hand to the abdominal walls and flannels wrung out of hot water wrapped round the colt.

Opiates and sedatives were carefully avoided and every effort made to set up peristalsis. At intervals during the day enemata were given by means of a long flexible tube passed as far as possible into the bowel and, as the foal was a valuable one, I paid four visits during the day and devoted a good deal of time and attention to him.

One is generally told in these cases that provided the foal suckles his dam the colostrum itself will purge him. This foal got on his feet and suckled during every interval of ease from pain, the only result being that, towards evening, marked symptoms of gastric tympany arose. The distention of the stomach through the abdominal floor could be plainly felt and slight eructations of gas coming up the œsophagus could be heard on auscultation. Also the foal, though in evident pain, did not go down so readily and when down sat up on his haunches with his chest off the ground. To relieve this trouble I passed a horse catheter down his œsophagus, using it as a stomach tube, by way of the nostril. This was followed by an immediate rush of gas up the tube and by considerable relief from pain.

Towards evening the little animal was becoming exhausted and I realised that unless I could get his bowels to act he would probably die of volvulus, as he was becoming very tympanitic. Fearing to use eserin in so young an animal, I decided to try the effect of pituitrin as a stimulant to the bowel muscle and administered 2 c.c. of the standardised extract (P., D. and Co.), into the gluteal muscles. Within 15 minutes peristalsis had commenced, a considerable amount of flatus was passed and in half an hour a normal evacuation followed. The abdominal pain ceased and an uneventful recovery ensued.

Since this case I have made the administration of pituitrin a routine treatment in first day colic of the foal, regarding the cause as being an inertia of the bowel, in which peristalsis has never commenced, and as a condition which very frequently defies the laxative action either of the colostrum of or medicinal laxatives.

Abnormal Calvings.*

By R. E. C. DOWLING, London.

Subject.—Lincoln Red cow (3rd calver).

Date.—April 27th, 1926.

History.—The cow was found standing in a loose box and beyond having a very distended udder (from which 1½ gallons had been milked an hour previously) and a slight discharge from the vulva, nothing was to be seen. The cow was not straining, although it was obvious she had "sprung."

Procedure.—Vaginal exploration revealed torsion of the uterus, the posterior part having a three-quarter turn to the right. The os was sufficiently dilated to admit the hand and the fœtus was easily felt. The fœtus had a normal fore presentation except that the head was twisted, so that the throat was uppermost. The examination being finished for the time being, the attendant veterinary surgeon issued instructions for the cow to be cast on her right side. This was done by means of a rope being tied to each hind fetlock and passing their ends through a rope collar applied to the neck; then with the assistance available the cow was carefully thrown on to some thick straw bedding. Her limbs were then made secure, and a further manual examination made after she had been rolled over on to her *left* side. The position of the uterus was much improved, though by no means normally straight, so the cow was dragged across the box (owing to the confined space) and once more rolled over to the left. This time the position was again improved and satisfied the operator, who then instructed the attendants to unrope the animal, thus allowing her to rise. The two fore legs of the calf were then roped. The roping of the head, however, was no easy matter, as owing to its abnormal position and the struggles of the calf *in utero*, it was most difficult to keep the "endless rope" in position. After several attempts this rope was discarded and an ordinary noosed rope (as used for roping limbs) was used, with a knot tied in it to prevent too much closure on the neck. This was soon applied and held its position well. Two or three large handsful of lard were then inserted into the passage and the calf pulled clear without the aid of pulleys, the cow standing throughout.

Artificial respiration was necessary to start the calf breathing and this was accomplished by holding the calf up by the hind legs and letting it down quickly; again raising it and letting down as before several times. This method, beside working the respiratory muscles, allowed a considerable amount of fluid taken in by the calf to escape by the mouth.

No complications arose. The cow cleansed an hour after the calf was removed. The calf was weighed, and turned the scales at just 100 lbs.

When seen next day the cow was cudding and quite at ease. The calf was also quite healthy and a fine specimen.

Subject.—*No. 2 Old Lincoln Red cow.*

Date.—April 13th to April 14th, 1926 (11.45 p.m. to 1.15 a.m.).

History.—The cow was found chained in her byre. She was on her feet, but was straining very badly and had been for some hours, as though assistance had been summoned the veterinary surgeon and his assistant were away attending the case previously described.

Procedure.—Manual examination per vagina showed this to be a case of "breech presentation," the tail only of the fœtus being in the passage. The passage itself was in a very dry condition, and the uterus tightly contracted. After some manipulation the hocks of the calf could be felt, but owing to the great size of the cow, which had a very long but narrow pelvis, and to the fact that the fœtus was situated well up in the uterus, they were difficult to reach. The constant straining of the cow intensified the difficulty. After some time, however, the operator was able to draw one foot within reach, and a rope was placed round the pastern. Instructing his assistant to push the point of the hock backwards and *to keep it covered*, he was then able to draw the foot backwards without the point of the hock pushing through the roof of the uterus. The other leg was dealt with in the same manner. With assistance the calf was then pulled clear, but during this procedure the cow went down. She fell in such a position that the neck chain was stretched tight and pulling hard on her neck. The farmer noticed this and was very worried and excited, as he was convinced she was choking. On inspection this was found not to be so, but he was so insistent that the calf, which was receiving attention, was left for a minute, the cow pulled forward, and the chain released. The cow, feeling all restraint gone, immediately rose, emitted an unearthly bellow, and bolted

* Cases submitted for award under the N.V.M.A. Clinical Prize Scheme for Students.

out of the shed, into the darkness of the night, nearly killing her calf and the excited farmer *en route*. Artificial respiration was needed in this case also to start the calf breathing. On calling next day the farmer, who had then recovered, stated that the cow had cleansed and she and her calf were found to be in quite good condition.

Severe Burn on Horse's Hind Limb; Picric Acid and Eusol Treatment.*

By J. W. H. Holmes, Edinburgh.

16/3/26. *Subject.*—Grey Gelding, about 10 years old.

History.—The animal had fallen down on ash and rubbish tip, along with cart, about two hours ago.

Symptoms.—There was a very severe burn on the near side, extending from a line on a level with point of hip down to the coronet, the outside of thigh, gaskin, hock, cannon and pastern all being involved. The animal was unable to put its foot to the ground.

Treatment.—Applied iod. bicarb. and ol. lini. in liberal quantities. Instructed owner to dress wound in a similar manner morning and night and to put the animal in a clean loose box and nurse well.

18/3/26.—All the skin over the involved area had sloughed, leaving a terribly large open wound.

Treatment.—Discussed case with owner, pointing out its seriousness. The owner, however, decided to keep and treat the animal.

Removed as much of dead tissue as possible and clipped neighbouring hair.

Lotion for Grey Gelding's Wound.

R. ac. picric, about ʒi.
aq., about 0.i.

Put the Ac. picric into a quart bottle and fill up with aq.

Sig.—Do not shake the bottle. Pour out some of the clear solution into a clean jug and apply to wound once daily, with syringe, as directed. Keep filling the bottle with water until all sediment has dissolved.

23/3/26.—Wound doing as well as could be expected.

Treatment.—As before.

30/3/26.—Wound doing fairly well, animal beginning to use limb.

8/4/26.—Wound progressing favourably.

Treatment.—Carry on, as before.

2/8/26.—Did not see the case between above date and this as was at College. During the interval the wound had been treated alternately with the two dressings previously used.

The animal could walk, trot and gallop, using the limb freely. The upper part of wound was nearly healed, the lower part was yet covered largely by scab. There was an enlargement half way down the gaskin and another on outside of fetlock.

22/9/26.—The wound progressing favourably. Enlargement still present. The latter to be treated when wound completely healed.

Treatment.—*The Dressing for Grey Gelding's Wound.*—R. calx chlorinatæ ac. boraci, aa. ʒiv. Wrap each up separately.

Sig.—Add the contents of the two packets to a gallon of water in stone bottle. Allow to stand for twenty-four hours. Syringe the wound once daily, as directed, with clear solution.

Cases of Canker of the Ear in Dogs.*

By A. J. Kennedy, Edinburgh.

History.—The affected dogs would shake the head, scratch at the ear, lose condition and give other signs of irritation.

Symptoms.—The external concha was generally filled with pus-like exudate; the external meatus was sometimes enlarged, and a squelching sound was heard on squeezing it. On cleaning out the external ear no definite lesions were visible.

Treatment.—*General*—Tonics and alteratives and nutritive food. *Local treatment.*—Holding the head on one side and pouring hydrogen peroxide, (one in seven of the twenty volumes) into the meatus. Instead of this, the ear was generally cleaned out with swabs of cotton wool, soaked in hydrogen peroxide, on the end of convenient forceps. Cleaning was carried out as far as possible down the meatus, and this was usually accompanied with considerable pain. Antiseptic astringent ear cones were inserted.

The result of the treatment varied with the stage of the canker: it disappeared in some cases but in others was more difficult to clear up.

A *post-mortem* was made on a Bulldog, destroyed because of painful canker in both ears. This dog had been losing weight for some time, and treatment, general and local, was unavailing.

I examined the external concha and meatus. There were no lesions visible till I fractured the petrous bone, and examined that part of the external meatus within it. Here there were well-marked ulcerations, involving also the membranous division between the outer and inner ear.

This was the seat of the disease, and in most cases ulceration in that sensitive part probably gives rise to the pain, secondary inflammation and filling of the whole meatus with pus. If *post mortem* findings in this case were typical, one realises that cleaning the outer ear with cotton wool cannot penetrate to the seat of the trouble. Certainly in an ordinary canker case it is seldom that one finds any lesions outside the cartilaginous meatus.

In this case the other organs were examined in the dog, and the following abnormalities were present.

Kidneys.—Both very small and pale in colour, and irregular on the surface, cortex very small.

Heart.—Slight thickening of the mitral valves.

Lungs.—Abnormally dull red in colour, even when washed in water. These were the naked-eye signs of chronic interstitial nephritis, and accorded with the history of constant ill health in the dog. I have noticed that most old, sickly dogs, when destroyed, show abnormal paleness of the kidneys, but I have never seen it so well marked as in this case.

* Cases submitted for award under the N.V.M.A. Clinical Prize Scheme for Students.

NOTES AND NEWS.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

Sept. 12-17th—N.V.M.A. Congress at Torquay (Sept. 12th—Committee and Council Meetings).
Sept. 22nd, 23rd.—Examination at R.C.V.S. for Jubilee Memorial Bursary.
Oct. 5th—R.C.V.S. Committee Meetings.
Oct. 6th—R.C.V.S. Committee Meetings.
Oct. 7th—R.C.V.S. Council Meetings.

Congress Items.

To facilitate the work of the Local Secretary (Mr. R. B. Nelder, 24 Dix's Field, Exeter), members who will be attending the Congress of the Association at Torquay are urged to complete and return to him at the earliest possible moment the blue application forms for tickets (for the various functions) which have been issued with the last two numbers of the *Record*. Remittance by post for tickets is not necessary and tickets will not be forwarded by post but will be obtainable during the Congress week at the Secretary's Office, Torbay Hotel, Torquay, when payment may be made.

We are advised that Major J. A. Dixon, T.D., M.R.C.V.S., Chief Veterinary Inspector for the City of Leeds, will (in conjunction with Mr. R. W. Hall, M.R.C.V.S., of Barry) open the discussion on Lieut.-Col. T. Dunlop Young's paper, "The Veterinary Surgeon in Relation to Meat Inspection," to be discussed by the Section of Veterinary State Medicine at Torquay, in place of Mr. A. Gofton, F.R.C.V.S., who is unfortunately prevented by unforeseen circumstances from attending the Congress.

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We are glad to have received information from the Local Hon. Secretary that a "rig" horse has now been procured for purposes of demonstration at Torquay.

R.C.V.S. Library Extension.

The decision of the Council to add another room to the Library of the College necessitates certain structural alterations which will prevent access to the Library by members until the work is completed. It is hoped, however, that the alterations will be finished by the month of October, and, in the meantime, every effort will be made to supply members by post with such volumes as they may require.

R.C.V.S. Obituary.

Matheson, James Allan, 11 N. High Street, Musselburgh, Edinburgh. Graduated, Edinburgh, 20th December, 1894. Died, 14th August, 1927.

Renfrew, John, 191 Pitt Street, Glasgow. Graduated, Glasgow, 10th April, 1882. Died, 18th August, 1927.

Tindall, Walter, Stillington, Easingwold, Yorkshire. Graduated, Edinburgh, 25th April, 1885. Died, 4th August, 1927.

Personal.

Marriage.—Lovell—Orrell.—August 10, at Union Street Wesleyan Chapel, Rochdale, by Rev. J. Sadler Reece, assisted by Revs. D. R. James and W. R. Turner, Reginald Lovell, M.R.C.V.S., D.V.S.M., son of Mr. and Mrs. S. Lovell, Wyke Regis, Dorset, to Alice M. Orrell, M.B., Ch.B., only daughter of Mr. W. W. Orrel, O.B.E., B.Sc., and Mrs. Orrell, Rochdale.

Mr. Lovell has just been appointed a Research Assistant in Comparative Pathology at the London School of Hygiene and Tropical Medicine.

Foot-and-Mouth Disease.

"An official of the Ministry of Agriculture was able to make the gratifying statement to me to-day," says a *Scotsman* representative, in the issue of that paper of 17th August, "that the country is now clear of foot-and-mouth disease. The outbreaks which took place during the summer in Stafford, Gloucester and Kent, have been dealt with so thoroughly that the last of the restriction orders will in all probability be withdrawn at an early date. Naturally the Ministry are cautious in expressing any opinion as to whether they have at last found effectual means of preventing the recurrence of the disease, but the discoveries which were made in connection with the outbreak in Lanark, and the comparative immunity which the country has experienced since the Order as to the feeding of offal to pigs was enforced, are regarded as hopeful signs. The slaughter policy to which the Ministry rigidly adheres has been sharply criticised in many quarters, but the officials of the Department do not waver in the belief that, drastic though it be, it is the right way of dealing with a disease which is so highly infectious."

CORRESPONDENCE.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.
All correspondence must bear the name and address of the contributor for publication.
The Editor does not hold himself responsible for the opinions of his correspondents.

Free Veterinary Aid.

To the Editor of The Veterinary Record.

Sir,—With the active co-operation of local veterinary surgeons many of this Society's Branches are arranging that free veterinary advice shall be given to animal owners who are unable to pay the usual fees—in some cases this is generously extended to free veterinary treatment. It is the earnest desire of this Society to enlist still further the co-operation of the veterinary profession in this matter because we realise that by this method a great amount of animal suffering can be prevented and because we are strongly of the opinion that all advice of this kind can best be given only by qualified practitioners. It is well-known that the medical profession charge very low fees and, through the hospitals, no fees whatever for medical attention in the case of a patient who cannot afford to pay, and it is hoped that a similar system can be formulated throughout the country in regard to animal treatment.

In the majority of instances, free veterinary advice only is given on the recommendation of our local Branch officials and every precaution is taken to see that people who can really afford to pay, do not get this *gratis* assistance.

It has been suggested to me that if it were announced through your paper that such a scheme has actually started, many veterinary surgeons would kindly offer their services for local work in this connection. I need hardly say I should be only too glad to hear from any members of the profession who are willing to co-operate in this way, so that I might be able to put them into touch with the officials of the nearest R.S.P.C.A. Branch, in order that a practical first-aid scheme might be inaugurated.—Yours faithfully, E. G. Fairholme, Captain, Chief Secretary.

Royal Society for the Prevention of Cruelty to Animals,
105 Jermyn Street, London, S.W.1.
August 18th, 1927.

The Editor acknowledges the receipt of the following:—

Minutes of the Second Annual General Meeting and of the Third Ordinary General Meeting of the Veterinary Medical Association of Kenya Colony and Protectorate, with copy of, and report of discussion upon, Mr. R. Daubney's paper, "Paratyphoid (Salmonella) Infection of Calves in Kenya," from Major H. Brassey Edwards, Hon. Secretary.

Report of a meeting of the Midland Counties' Division at Stamford, Lincs., from Mr. H. J. Dawes, Hon. Secretary.

Communications from Major H. Allen (Punjab), Messrs. R. Daubney (Kenya), W. L. Little (Reading), G. P. Male (Reading), and T. F. Prime (Upper Norwood), and Lieut.-Col. J. W. Rainey.